



Forest and Rangeland
Ecosystem Science Center

Discussion of Objective-setting for the Resumption of Grazing Following Wildfire and Rehabilitation Activities

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The Issues

Post fire decisions



- Rehabilitation?
- Grazing Rest - How long?
- How do you set objectives for grazing resumption?
 - Two year minimum rest - Why?
 - Are there definitive studies stating otherwise?

Plant Responses to Fire

Fire Regime

- Fire Severity
 - Does fire change ecosystem properties
- Fireline Intensity
 - Energy released by fire
- Fire residency time
- Biomass consumed

Plant Response

- Growth bud locations
 - Above, at or below soil surface
 - Relative to fire type
- Heat insulation
 - Bark or leaves
- Seed bank

Examples



Goal of Post-fire Grazing Rest

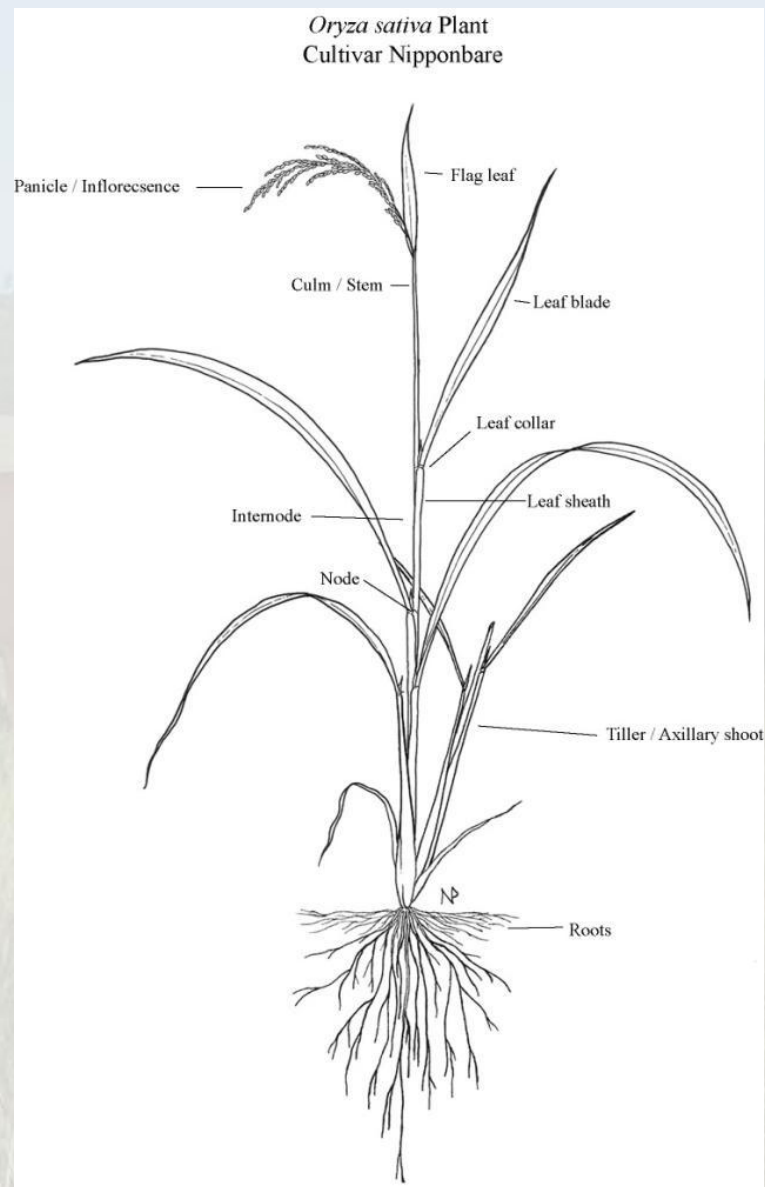
- Recovery of Residual Plants
 - What is recovery?
 - Number of culms?
 - Inflorescences?
- Regeneration
 - Seeds?
 - Seedlings?
- Provide cover to prevent erosion



Grazing

Pre-boot to boot

- Active growth
- Defoliate apical bud? (Boot stage)
 - Stimulates axial bud growth
 - Next years plant with fewer culms
 - May impact production & seeds



Grazing

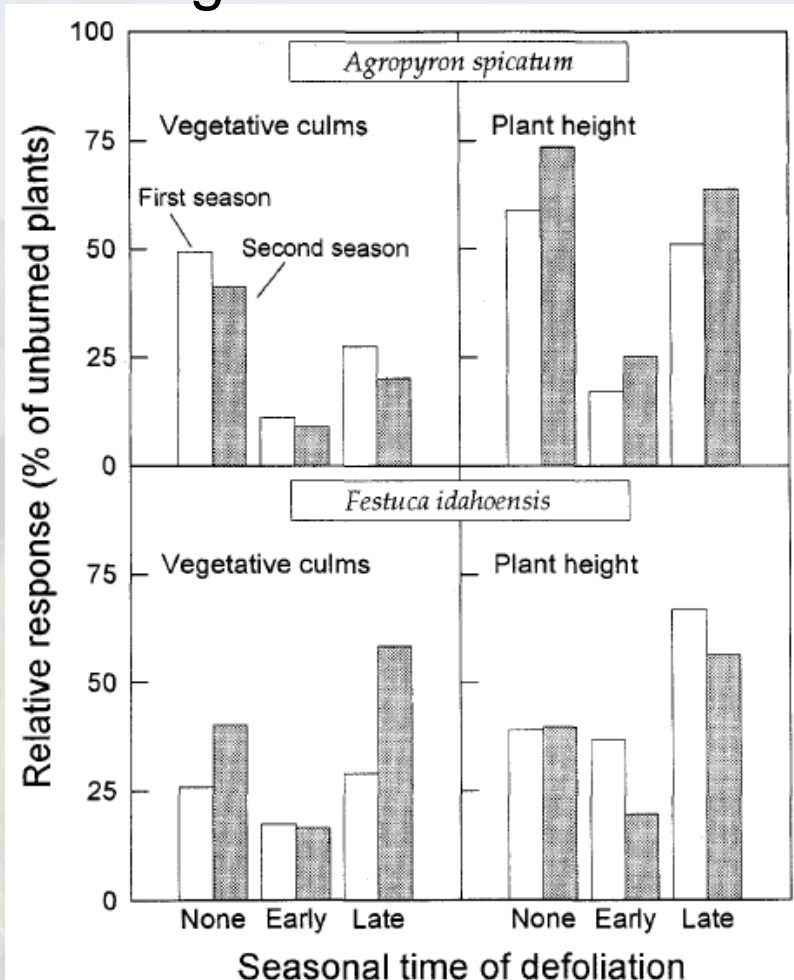


Post-dispersal

- Dormant
- Buds intact
- Cover is reduced
 - Snow capture?
 - Erosion prevention?

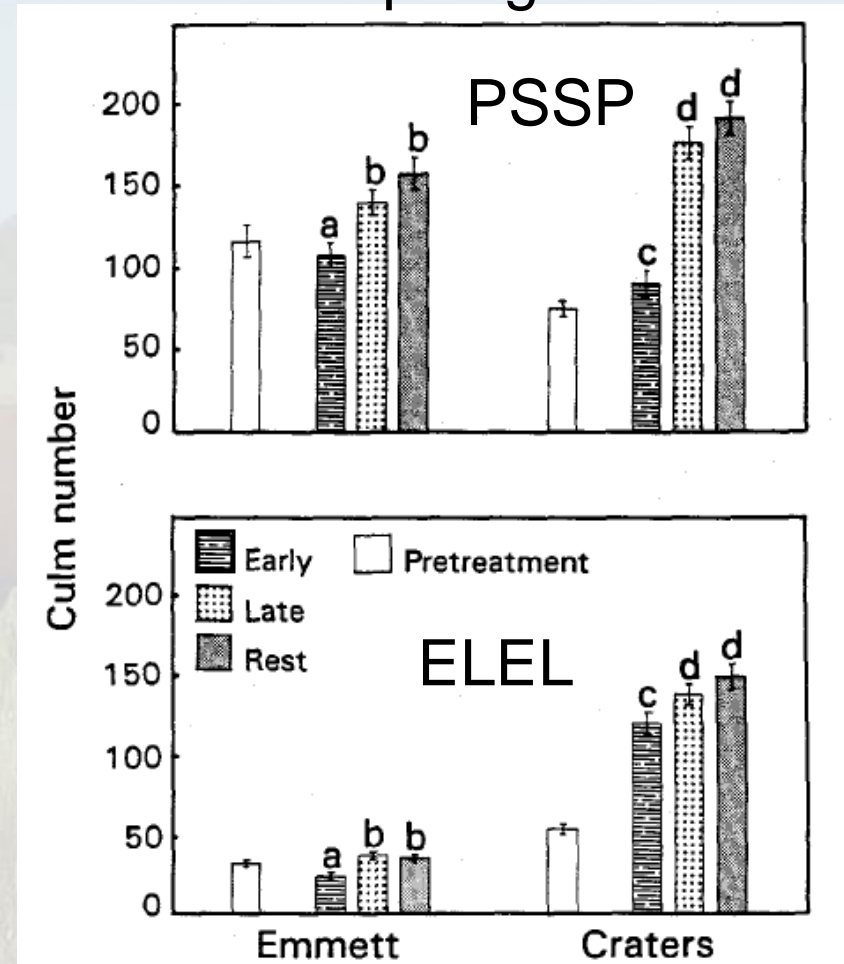
Clipping Studies

Douglas fir site



(Bunting et al. 1998 Int J Wildl Fire)

Mnt or 3-tip sage sites

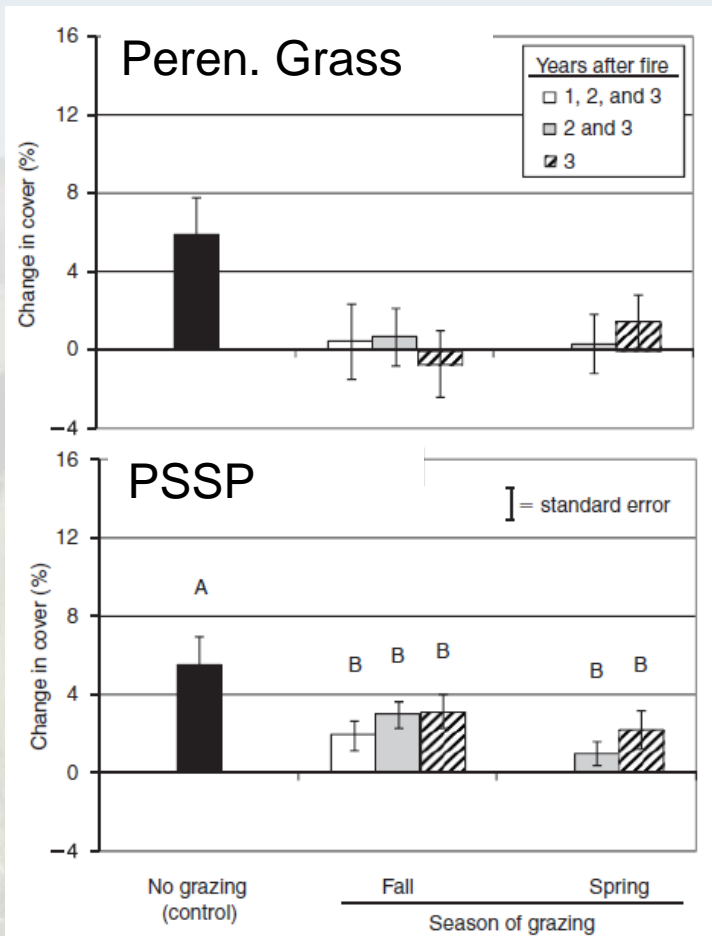


(Jirik & Bunting 1993 Int J Wildl Fire)

Sheep & Cattle

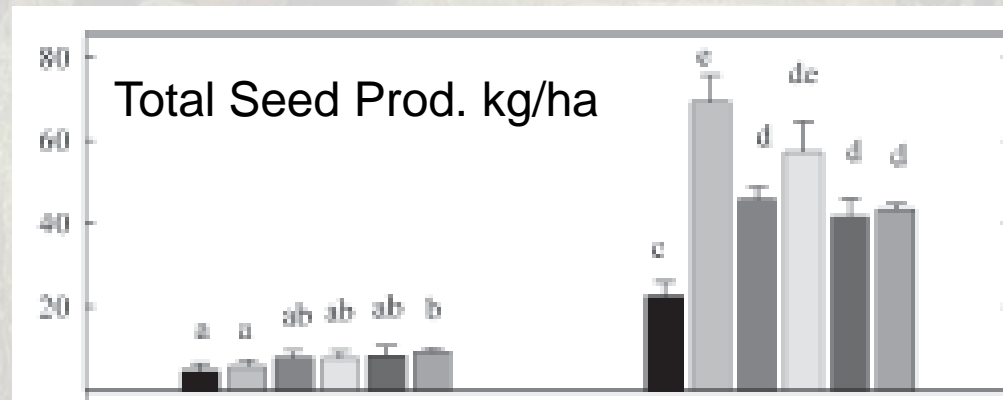
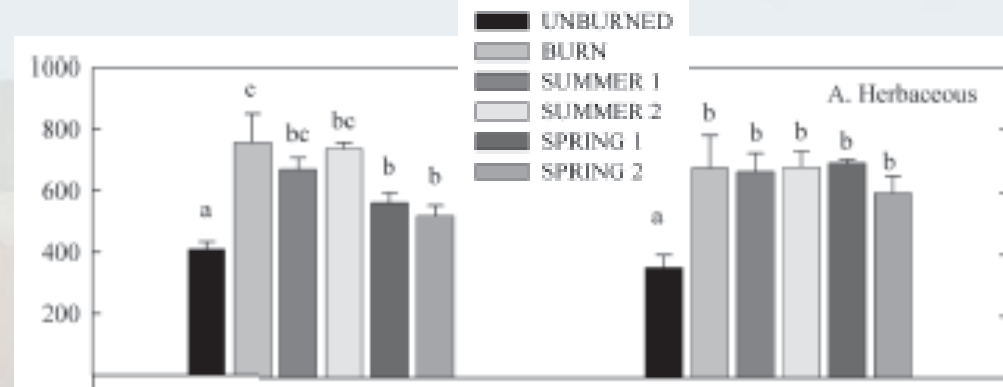
3-tip sage site

Wyoming Big sage site



(Roselle et al 2010 Int J Wildl Fire)

Herbaceous Current Year's Growth (kg/ha)



Year 3

Year 4

(Bates et al 2009 Rangel Ecol Manage)

Conclusions

- 4 Studies - 2 use animals
- 3 of 4 are single site case studies
- Findings
 - Grazing with no rest showed mixed results
 - Dormant-season grazing showed least impacts
 - Species specific results
 - FEID more susceptible to high fire intensity
 - Grasses under shrubs vulnerable to fires

Not studied

- Ground Cover for erosion protection?
 - Compare to Slight-to-Mod departure or better sites?
 - Minimum to achieve? 50% or more?
- Composition Structural/Functional Groups
 - Reflect the composition of a post-burn community on the ecological site
- Comparisons to Unburned sites
 - Would help in setting comparative objectives

Rehab/Restoration & Grazing

- All based on expert opinion/observations
 - Plummer, Reynolds, Vallentine & coauthors
 - Summarized in Chap 16 of Monsen et al 2004 vol 1 USFS RMRS GTR 136.
- References on the internet of a study by Bruce et al 2007 Professional Anim Sci
 - Seeding failed

Minimum Years nongrazing

Table 1—Recommended minimum years of nongrazing following revegetation of different vegetative types, and according to special treatments and site conditions.

Vegetative type	Special treatment or site conditions	Recommended growing seasons with no livestock grazing following seeding
Subalpine		3
Aspen-conifer		2
Aspen, Gambel oak, maple	Broadcast seed prior to leaf fall	3
Ponderosa pine		2
Mountain brush		2
Juniper-pinyon	Above 14 inches (36 cm) annual precipitation	2
Juniper-pinyon	Below 14 inches (36 cm) annual precipitation	3
Mountain big sagebrush		2
Basin big sagebrush	Above 14 inches (36 cm) annual precipitation	2
Basin big sagebrush	Below 14 inches (36 cm) annual precipitation	3
Wyoming big sagebrush	Above 12 inches (30 cm) annual precipitation	3
Wyoming big sagebrush	Below 12 inches (30 cm) annual precipitation	4
Black sagebrush		3
Shadscale		3 to 4
Black greasewood		2
Inland saltgrass		1
Blackbrush		3

(Stevens, R Chap 16 in Monsen et al 2004)

Special Conditions = Additional Years

Table 2—Additional growing seasons of nonuse (beyond recommended growing seasons indicated in table 1) required due to special conditions.

Site conditions	Years
Burned and broadcast seeded	+1
Slower growing shrubs seeded or released (table 3)	+2 to +4
Seedlings in cheatgrass, red brome, medusahead, or halogeton communities	+1 to +3
Poor seedbed conditions	+1
Erosive soils	+1 to +3
Soils with exposed and disturbed subsoil	+2
Precipitation 2 or more inches (5 cm) less than average during first growing season	+1 to +3
Precipitation 2 or more inches (5 cm) less than average during second and third growing season	+1
Outbreak of insects or disease	+1 to +3
Excessive number of rodents and rabbits	+1 to +3

Years To Establish Gear to Maximum Species

Table 3—Years normally required for certain plant species to establish, mature, and flower.

Fast 2 years	Intermediate 2 to 3 years	Slow 3 to 4 years	Very slow 4 to 6 years
Bluegrass, Kentucky	Alfalfa	Crownvetch	Balsamroot
Brome, mountain	Aster spp.	Lupine spp.	Bitterbrush, antelope
Burnet, small	Brome, Regar	Milkvetch, cicer	Ceanothus, Martin
Kochia, forage	Brome, smooth	Rabbitbrush, low	Ceanothus, snowbush
Orchardgrass	Canarygrass, reed	Rabbitbrush, rubber	Chokecherry, black
Rye, mountain	Dropseed, sand	Ricegrass, Indian	Cliffrose
Squirreltail, bottlebrush	Eriogonum, Wyeth	Sacaton, alkali	Currant, golden
Sweetclover, yellow	Fescue, hard sheep	Sagebrush, big	Elderberry, blue
Timothy	Flax, Lewis	Sagebrush, black	Ephedra, green
Wheatgrass, crested	Globemallow	Saltbush, fourwing	Mountain mahogany, curleaf
Wheatgrass, desert	Goldeneye, showy	Shadscale	Mountain mahogany, true
Wheatgrass, intermediate	Penstemon, Palmer	Sweetvetch, Utah	Serviceberry, Saskatoon
Wheatgrass, pubescent	Sainfoin	Wildrye, Great Basin	
Wheatgrass, slender	Sweetanise	Wildrye, Russian	
	Wheatgrass, bluebunch	Winterfat	
	Wheatgrass, Siberian		
	Wheatgrass, tall		

Setting Objectives for Resuming Grazing

No Rehabilitation

- Resilient Herbaceous Community
 - At or below acceptable exposed bare ground % cover?
 - Culm or inflorescence production relative to unburned, dormant or early season grazed?
 - Production of perennials within Ecological Site range?

Setting Objectives for Resuming Grazing Rehabilitation Site

- Seedlings producing inflorescences
- At or below acceptable exposed bare ground
- Seedlings producing minimum set of veg. culms?
- If seeding fails - resume grazing to control fuel loads?

Research Needed to Set These

- What are reasonable quantitative indicators for resuming grazing?
 - Research must move away from testing two-year minimum policy
 - Need indicators that will reflect year-to-year weather variation.

Discussion

- Your input!
- What works; What doesn't?

